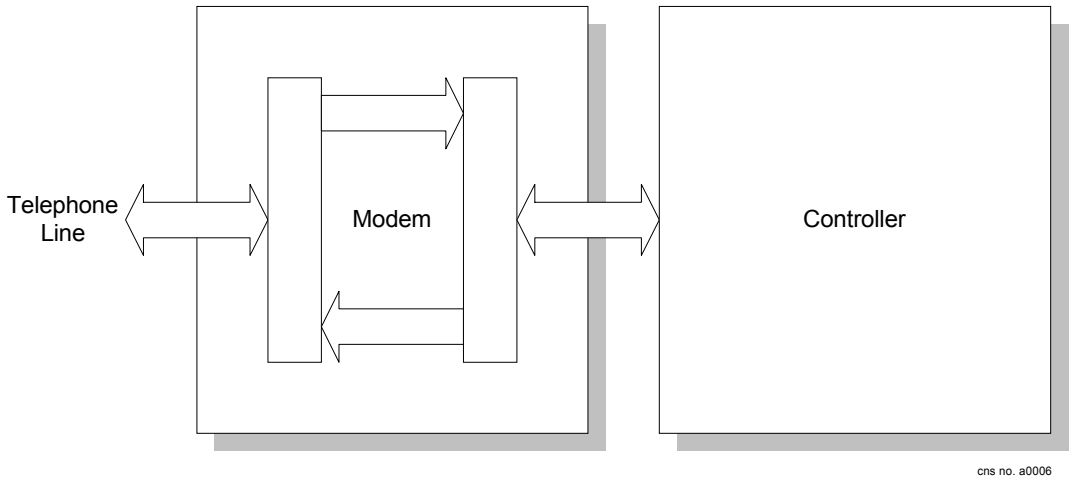
Group: **Controls**

Part Number: **629976**

Date: **October, 1996**

MicroTech®
Modem Kit



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Introduction

You can monitor various MicroTech controllers and panels from a remote site using the MicroTech Modem and Monitor™ software. This manual contains installation procedures for the MicroTech® Modem. It contains component descriptions, field wiring options and requirements, and network commissioning and service procedures.

For specific information about unit or auxiliary controllers, refer to the appropriate MicroTech controller installation manual (see Table 1). For installation and commissioning instructions and general information on a particular unit, refer to its model-specific installation manual.

Table 1. MicroTech Controller Installation Literature

	MicroTech unit or auxiliary controller	Installation & Maintenance Data bulletin number
	Series-100 centrifugal chiller	IM 403
	Series-200 centrifugal chiller	IM 616
	Reciprocating chiller	IM 493
	Screw chiller	IM 549
	Applied rooftop	IM 483
	Self-contained air conditioning	IM 608
	Series-100 unit ventilator	IM 509
	Series-300 unit ventilator	IM 613
	MicroTech Loop Water Controller	IM 431
①	MicroTech Absorption Gateway	IM 620
②	MicroTech Communications Gateway	IM 661

Notes:

1. The MicroTech Absorption Gateway (MAG) is an interface to McQuay absorption chillers, which use Sanyo controllers.
2. The MicroTech Communications Gateway (MCG) is an interface to McQuay water source heat pumps, which use MicroTech 2000™ controllers.

⚠ CAUTION

Static sensitive components.

A static discharge can damage electronic circuit board components.

Discharge any static electrical charge by touching the bare metal inside the control panel before doing any service work. Never unplug cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

NOTICE

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may interfere with radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at his or her own expense. **McQuay International disclaims any liability resulting from any interference or for the correction thereof.**

General Information

This manual contains information on the components, installation, and service of the MicroTech® Modem Kit. You can monitor various MicroTech panels and controllers from a remote or off-site location with the MicroTech Modem and MicroTech Monitor™. See the list below for the MicroTech controllers that can incorporate a modem.

- Network Master Panel (NMP)
- Series 200 Application Specific Controller (ASC-200)
- Loop Water Controller (LWC)
- Application Specific Controller (ASC)
- Remote Monitoring and Sequencing Panel (RMS)
- Remote Monitoring and Control Panel (RMC)
- Chiller System Controller (CSC)
- Chiller Plant Controller (CPC)
- Centrifugal Chiller Unit Controller
- Reciprocating Chiller Unit Controller
- Self-contained Air Conditioning Unit Controller
- Screw Chiller Unit Controller
- Applied Rooftop Unit Controller

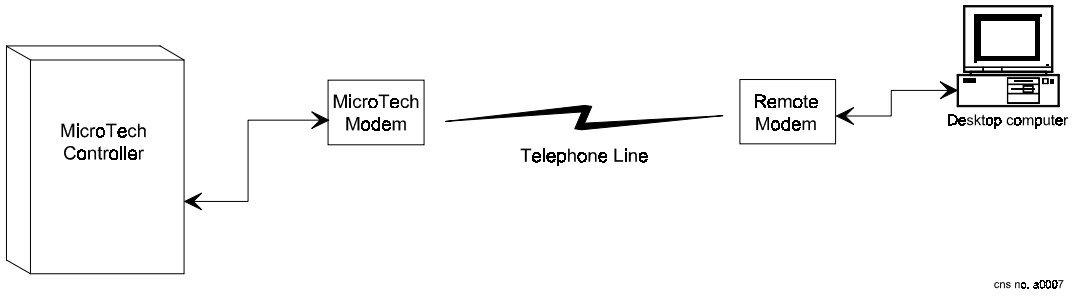
Component Data

The MicroTech Modem Kit includes a modem, an interface cable, an extension cable, mounting brackets, and a ¼–inch foam gasket.

Modem

A modem is the communications interface between a MicroTech controller and a telephone line. It can connect a remote PC using another modem to the controller so that the PC operator at the remote site can monitor the controller. Figure 1 shows how modems can connect a MicroTech Controller to a remote PC. The MicroTech modem is an Aprotek Model 7600, 14,400 bps data/fax modem.

Figure 1. Modem System Block Diagram



The modem has a DB-9 (female) RS-232 port, an RJ-11C phone jack, and a 2-pin header for power.

Note: To monitor MicroTech controllers via a modem, your PC must have a modem and the appropriate MicroTech Monitor software.

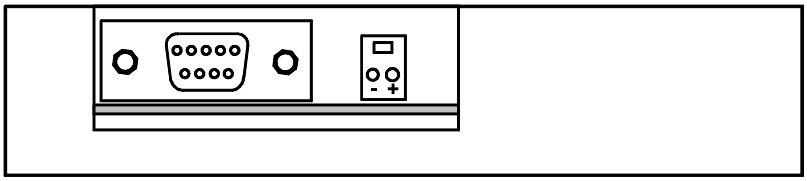
Phone Jack

The phone jack (RJ-11C) accepts a standard telephone line plug. The phone jack is opposite the RS-232 port. A connector on the telephone line mates to the phone jack. By calling the telephone number assigned to the modem and having the appropriate PC software and modem, you can communicate with the MicroTech controller.

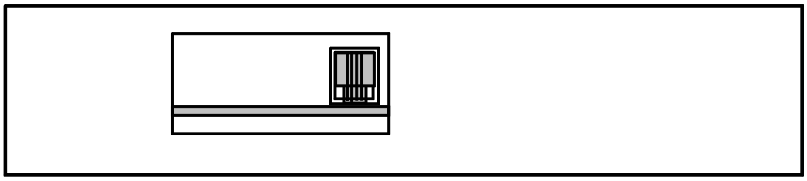
DC Power Header

The DC Power Header is the input for DC power. The 2-pin header is adjacent to the RS-232 port. A plug on the interface cable (see Figure 2) connects to the header and supplies power to the modem.

Figure 2. Aprotek Model 7600 Modem (14.4 kbps)



RS-232 Port and 2-Pin Power Header



RJ-11 Telephone Jack

cns no. a0003

Modem Interface Cable

The Modem Interface Cable connects the modem to the MicroTech controller. Figure 3 shows the interface cable. The cable has a nine-pin male RS-232 connector on one end that is secured to the nine-pin female connector on the extension cable.

The other end of the interface cable has a power wire, an AMP connector, a power plug, and a 34-pin call initiate connector.

Power Wire

The power wire is a red, 22 AWG wire. This wire supplies power to the regulator in the Interface Cable. It must be connected to a 12 to 17 Vdc source in the MicroTech controller.

AMP Connector

The AMP connector mates directly to Communication Port A on a MicroTech controller. Port A is the RS-232 port of the controller.

Power Plug

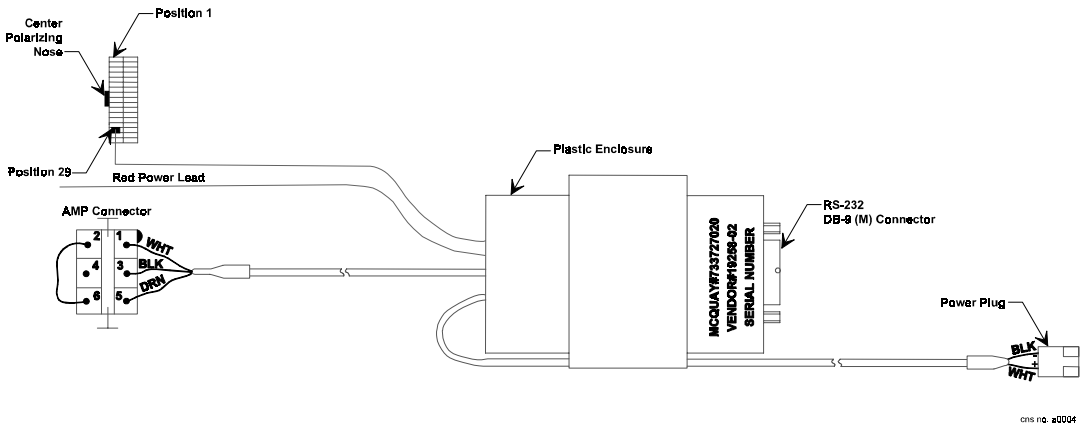
The power plug connects to the 2-pin power header on the modem. This plug supplies regulated +5 Vdc to the modem.

Note: The controller must supply power to the modem.

34-Pin Call Initiate Connector

The 34-pin call initiate connector attaches to the Analog Inputs socket in a MicroTech controller. This feature is used only when the modem is connected to a Modem Alarm Unit (MAU).

Figure 3. Interface Cable



Extension Cable

The Extension Cable connects the Modem Interface Cable to the modem. The cable has a nine-pin male RS-232 connector on one end and a nine-pin female RS-232 connector on the other end. The female connector is secured to the nine-pin male connector on the interface cable with screws. The male connector mates with the female connector on the modem.

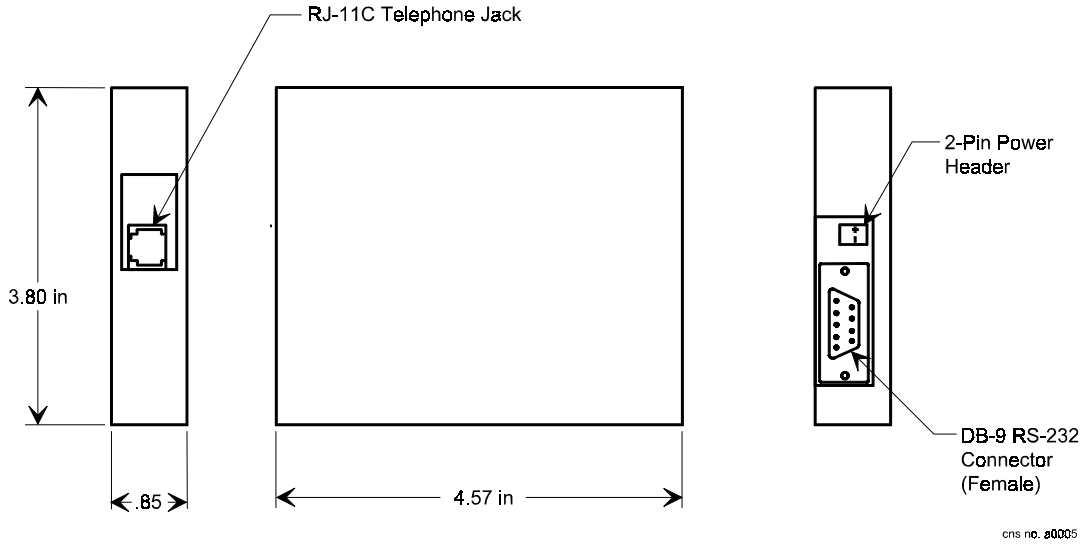
Installing the modem kit consists in mounting the modem to the panel, wiring the interface cable to the controller, and connecting cables and a telephone line to the modem.

Mounting the Modem

To mount the modem in a control panel, use the mounting bracket provided with the modem kit.

A U-shaped bracket fits around the modem and holds it in place in the panel. A ¼-inch thick foam gasket is placed between the bracket and the modem. Locate an area in the panel that can accommodate the bracket and modem. Refer to the product-specific installation manuals for details on where the modem should be mounted. Place the modem and foam gasket inside and the bracket. Secure the modem and bracket to the panel using the screws provided.

Figure 4. Modem Dimensions



Wiring the Interface Cable

Wiring the interface cable involves finding the power source for the power wire. The red power wire must be connected to a 12 to 17 Vdc power supply inside the MicroTech panel.

⚠ CAUTION

Voltage surge or short can cause damage to the controller.

Turned off power to the controller before you connect the power wire in order to prevent shorting the power supply or having a sudden voltage surge.

On NMP, RMS, or RMC controllers, pin 8 on the Aux/Out connector strip provides approximately 13 Vdc (see Figure 5). A factory wired pigtail on the Aux/Out connector with a crimp-style socket is provided. The power lead is then inserted into the pigtail socket and crimped.

If the MicroTech panel has a field wiring terminal that is connected to a 12 to 17 Vdc power supply, connect the power wire to that terminal. Refer to Table 2 for power supply field wiring terminals in the various MicroTech controllers that supply 12 to 17 Vdc.

Table 2. Power Supply Terminals (12 to 17 Vdc)

MicroTech Controller	Terminal
Applied rooftop	TB6-42
Screw chiller	TB4-41
Reciprocating chiller	TB7-146
Centrifugal chiller	Terminal 67
Application Specific Controller (ASC)	TB3-25 or TB3-26
Self-contained Air Conditioning (SCAC)	12 Vdc terminal
Loop Water Controller (LWC)	TS2-13
Chiller Plant Controller (CPC)	TS2-13
Series 200 Application Specific Controller (ASC-200)	13 Vdc terminal
Chiller System Controller (CSC)	13 Vdc terminal

Note: Measure the voltage at the field wiring terminal before connecting the power wire to ensure that the voltage is correct.

Connecting the Cables and Connectors

There are several connections to make before the interface cable wiring is complete.

Interface Cable/Extension Cable

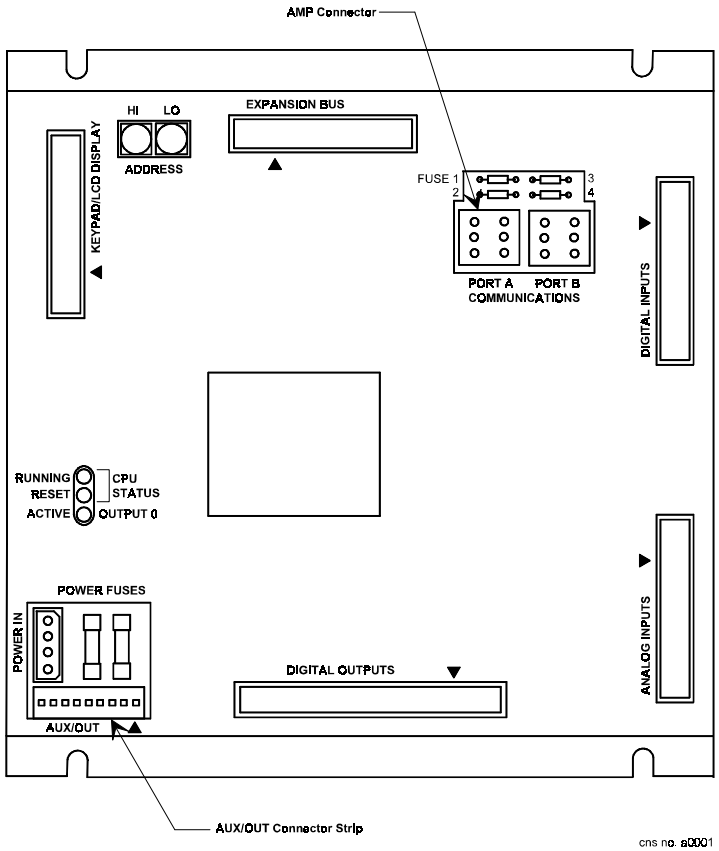
The interface cable has a 9-pin male connector that mates to the female connector on the extension cable. Mate and secure the two connectors together by tightening the screws on the extension cable connector.

Note: Be careful when you tighten the screws on the connector. Do not turn one screw more than two rotations before you turn the other screw. This prevents damage to the pins and the connectors.

AMP Connector

The AMP connector attaches to Communication Port A of a MicroTech controller (see Figure 5). Insert the AMP connector into Port A.

Figure 5. MicroTech Controller (200 Series)



The AMP connector must be connected to the controller before the modem can operate. The modem signal and power ground connections are made through the AMP connector..

The AMP connector connects to all modem-compatible MicroTech controllers except the Application Specific Controller (ASC). The ASC has a Phoenix-type connector. If the modem is connected to an ASC, use the adapter cable to connect to Port A. The adapter cable is available by purchasing the MicroTech PC Communications Cable Kit.

34-Pin Call Initiate Connector

The 34-pin call initiate connector plugs into the Analog Inputs port of a Modem Alarm Unit (MAU) controller. If the modem is not connected to an MAU, coil the unused cable and secure it to the interface cable housing.

Power Plug

The power plug connects to the 2-pin power header on the modem. This connection supplies regulated power to the modem.

Phone Jack

The RJ-11C phone jack is the communications port of the modem. The phone jack accepts the plug on the telephone line. Insert the telephone connector into the jack until you hear a clicking sound. The clicking sound ensures that the connectors are secured together.

Modem Configuration

Modem configuration consists in setting the port speed, connect speed, and configuration string. The modem is ready to use when it arrives on site because the configuration is set at the factory. You should not need to change the configuration.

Port/Connect Speed

The port speed is the data transmission rate between the MicroTech controller and the MicroTech modem, and the connect speed is the data transmission rate between two modems. Modems negotiate connect speed with each other to find the highest speed where both modems can conduct reliable communications. The port speed of the MicroTech modem is set to 9600 bps at the factory. The Port A speed of the controller must match the port speed of the modem before communications can begin. To change the Port A speed of the controller, you must change the value of a memory location of the controller.

The MicroTech modem adjusts its port speed to match the port speed of a processor sending it any AT command. For example, if you were to connect your PC to the modem and set the RS-232 (serial) port of the PC to 2400 bps and then send the modem an AT command, any AT command, the modem would adjust its port speed to 2400 bps and continue to use 2400 bps until you changed the port speed.

Changing Controller Port Speed

You can change the port configuration of the controller in three different ways.

- Change it on the controller keypad display
- Change a Monitor table
- Change the controller memory

When you use a Remote Monitoring and Sequencing Panel (RMS) or a Remote Monitoring and Control Panel (RMC), you can change the port configuration with the keypad display. Refer to the appropriate Operation Manual for more information.

Also, you can change the port configuration in some Monitor programs. Consult your Monitor User's Manual or contact your McQuayService representative for more details.

If you cannot change the port configuration with the keypad or in a Monitor table, see you Monitor User's Manual for procedures to change controller memory locations.

⚠ CAUTION

Never change the Port B speed.

Will cause loss of communications with the network.

Do not change the Port B speed under any circumstance because the controller communicates with the rest of the network via Port B at a fixed transmission rate of 9600 bps.

► **To change the Controller Port Configuration**

Use a PC with the appropriate Monitor software.

1. Connect an IBM compatible PC directly to Port A of the controller using the PC cable from the PC Communications Cable Kit. The PC Communications Cable Kit is available from McQuay International.
2. Open your Monitor application. See the Monitor User's Manual for details.

If you cannot make a direct connection to the controller, contact your McQuayService representative for help.

1. Use the Read/Write command to directly access and change the non-volatile memory of the controller.
   a. Change the data transmission rate of Port A. See Table 3 for memory locations and see
   b. Table 4 for parameter values.

Note: Transmission rates for both ports are stored in one byte of memory (two hexadecimal digits). The most significant hexadecimal digit represents the rate of Port B and the least significant digit represents the rate of Port A.

   c. Initiate a software reset: change the value of the Reset location to an even number greater that 2.
   d. Record the EOS Checksum. See Table 3 for memory locations.
   e. The Correct Checksum must match the EOS Checksum in order for the program to run. Change the Correct Checksum to the EOS Checksum value.
   f. Initiate a software reset: change the value of the Reset location to an even number greater that 2.

Table 3. Memory Locations

Parameter	Controller Series	Memory Location (Hex)
Port Transmission Rate	100	8010
	200	0A10
EOS Calculated Checksum	100	8002
	200	0A02
Correct Checksum	100	8001
	200	0A01
Software Reset	100	0204
	200	0204

Table 4. Controller Communications Port Speeds.

Baud Rate	Hex Code
300	4
1200	6
2400	8
4800	9
9600	B

Configuration String

The modem configuration string is an AT command that initializes the modem. This configuration is set at the factory and resides in the non-volatile memory of the modem. If a problem with configuration occurs, the configuration string must be reset. You can reset the configuration string from PC running a general purpose communications program such as Terminal in Windows. Connect the modem to the serial port of the PC and issue the AT command.

The following AT command configures the modem: **AT&F0S0=1B0E0Q1&D0&K0&W0**. Table 5 explains each command in the string.

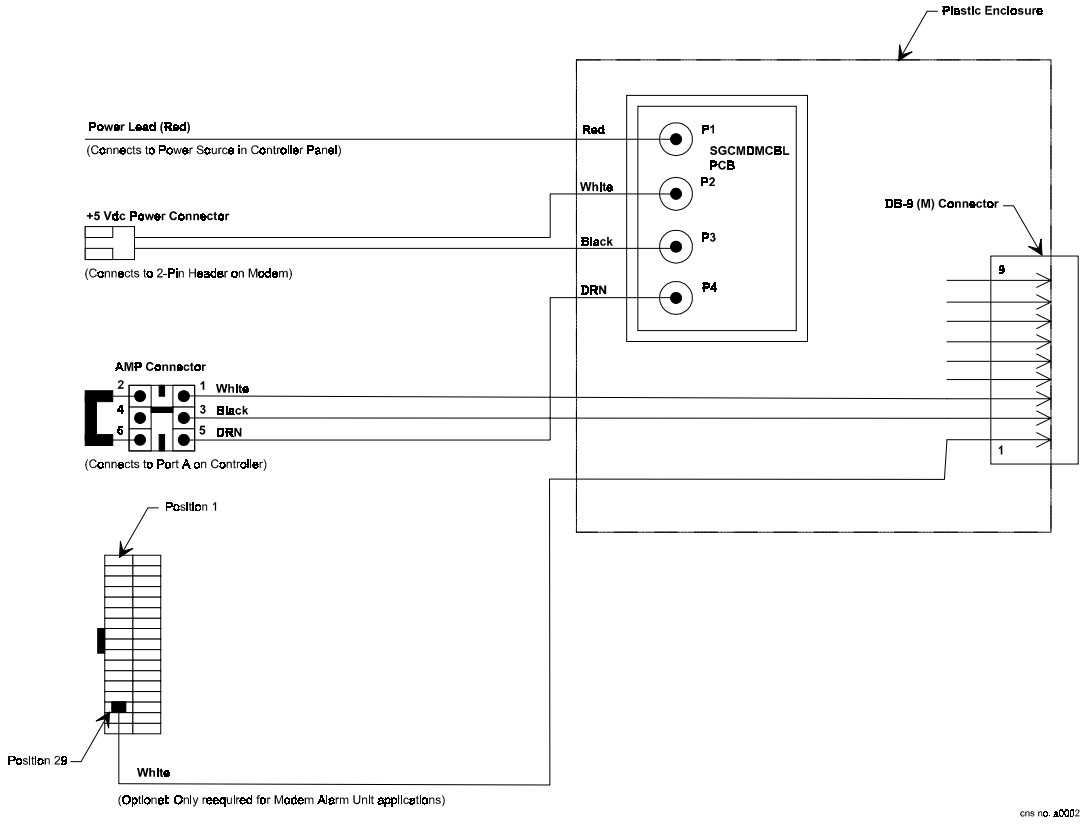
Table 5. AT Command Definitions

Commands	Description	AT Commands
&F0	Restore Factory Settings	AT&F0
S0=n	Enables Auto Answer (>0)	ATS0=1
Bn	CCITT Standard (0)	ATB0
En	Disable Char Echo (0)	ATE0
Qn	No Result Codes	ATQ1
&Dn	Ignore DTR (0)	AT&D0
&Kn	Disable Flow Control	At&K0
&Wn	Write Settings to NVRAM Template 0	AT&W0

Note: For high speed modems, flow control must be disabled.

Wiring Diagram

Figure 6. Modem Wiring Diagram



Test Procedures

If a problem still exists after troubleshooting, contact your McQuay representative for further help.

Troubleshooting Power Problems

The red power lead in the modem interface cable connects to a 12 to 17 Vdc source in the MicroTech controller. The power plug on the interface cable delivers regulated +5 Vdc power to the modem.

The Modem Does Not Power Up.

Cause: The power lead is not connected to a 12 to 17 Vdc supply.

Solution: Refer to the product-specific installation manuals to find a proper voltage supply in the MicroTech controller.

Cause: The power lead is improperly connected to the controller voltage supply.

Solution: Check the connection to the power supply.

Cause: The power plug is not connected to the modem.

Solution: Connect the power plug to the 2-pin power header on the modem.

Cause: The interface cable may have a poor solder/connection point at the power plug.

Solution: Measure the resistance (ohms) with a VOM (Volt-Ohmeter) or DMM (Digital Multimeter) to verify the correct wiring.

Cause: The AMP connector is not plugged into Port A of the MicroTech controller.

Solution: Plug the AMP connector into Port A of the Micro-Tech controller.

Cause: The AMP connector has a poor connection.

Solution: Measure the resistance (ohms) using a VOM (Volt-Ohmeter) or DMM (Digital Multimeter) to verify the correct wiring. Use the wiring diagram in Figure 6.

Cause: The interface cable is not properly connected to the modem extension cable.

Solution: Reconnect the interface cable to the extension cable.

Cause: The interface cable may have a broken or pushed in male connector pin.

Solution: Disconnect the interface cable and inspect for broken or pushed in pins.

Troubleshooting Communications Problems

If you cannot establish a communications link or it is lost, you may have a communications problem.

The Computer Cannot Communicate with the MicroTech Controller via the Modem.

Cause: The phone line is not connected to the phone jack on the modem.

Solution: Connect the phone line to the modem's phone jack.

Cause: The AMP connector is not properly connected to Port A of the controller.

Solution: Reconnect the AMP connector to Port A of the controller.

Cause: The AMP connector has a poor connection.

Solution: Measure the resistance (ohms) using a DVM (Digital Voltmeter) to verify the correct wiring. Use the wiring diagram in Figure 6.

Cause: The connect/port speed does not match the port speed of the MicroTech controller.

Solution: Connect the modem to a PC and change the modem configuration. See Modem Configuration on page 10 for details.

Cause: The configuration string of the modem is incorrect.

Solution: Re-enter the configuration string using a PC and the correct communications software (see Table 5).

Cause: The communications password is incorrect.

Solution: Enter the correct password in the Monitor program and try again or contact McQuay Service.

If a problem still exists after troubleshooting, contact McQuayService.

McQuay International
13600 Industrial Park Blvd., P.O. Box 1551, Minneapolis, MN 55440 (612) 553-5330